

Drugs used in fish transportation

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Fish transportation

- The chemical methods of treating the transport medium, aimed at increasing the capacity volume of the transport units and preventing physiological and health damage to the fish, constitute an integral part of the complex problem of fish transport.
- They include the use of anaesthetics, water-hardening and oxygen-producing chemicals, bacteriostatics, buffering and antifoam chemicals.

- **Use of Fish Tranquilizers**
- During transport, sedation of the fish is desirable, since oxygen consumption and CO₂ and NH₃ production are all decreased. However, deep sedation is undesirable because the fish may fall to the bottom, pile up and smother. If pumps are used, the fish may be pulled into the screen, the air may move the deeply sedated fish about and cause a loss of scales.

- Anaesthesia usually applies only to transported brood fish. In practice, the fish are first tranquilized with the normal dose and put into the transport tank, where original concentration is diluted by 50 percent by adding the same amount of fresh water.

- Among the broad spectrum of anaesthetics, tricaine methanesulfonate (MS-222) and quinaldine appear to be used most frequently.

- **Application of Sodium Chloride and Calcium Chloride**
- Handling stress and delayed mortality of fish can be decreased by the addition of sodium chloride (NaCl) and calcium chloride (CaCl₂) to the transport water. The sodium ion tends to “harden” the fish and reduce slime formation, and the calcium ion suppresses osmoregulatory and metabolic dysfunction. Calcium chloride may not be needed in hard water already containing high concentrations of calcium. Dupree and Huner (1984) recommended the addition of 0.1 to 0.3 percent salt and 50 mg.1-1 calcium chloride.

- **Chemicals as Oxygen Sources**
- There are contradictory views concerning the use of chemicals as oxygen sources during fish transport. Huilgol and Patil (1975) tested the use of hydrogen peroxide on transported carp fry and found that one drop (1 ml = 20 drops) of hydrogen peroxide (6 percent concentration), applied to 1 litre of water, increased the oxygen content by 1.5 mg.l^{-1} when the temperature was 24°C . CO_2 content and water pH were not influenced by the addition of hydrogen peroxide.

- **Bacteriostatic Chemicals**

- Antibacterials are also used to check the development of bacteria in transport units. Among the wide spectrum of bacteriostatic drugs, the following are used most frequently: nitrofurazone (furacin) at 10 mg.l^{-1} , acriflavin at 1 to 2 mg.l^{-1} , oxytetracycline (terramycin) at 20 mg.l^{-1} Combiotic at 15 mg.l^{-1} (Dupree and Huner, 1984) and neomycin sulphate at 20 mg.l^{-1} (Amend *et al.*, 1982).

- **Ammonia Control**

- To control ammonia concentration in the transport bags when the transport is expected to be long, it is recommended to use clinoptilolite, a zeolite mineral. Amend *et al.*, (1982) tested with success the dose of 14 g of clinoptilolite per litre, Bower and Turner (1982) tested the doses of 10–40 g.l⁻¹; the concentration of non-ionized ammonia nitrogen never exceeded 0.017 mg.l⁻¹ in bags containing even the lowest dose of clinoptilolite, whereas concentrations as high as 0.074 mg.l⁻¹ were recorded in the control bags left without clinoptilolite.

- **Antifoam Chemicals**

- The formation of foam and scum, especially when drugs are used in transporting fish or on water which is heavily laden with organic material (secretions and excretions, such as mucus and excrements) often becomes quite bothersome.
- The foam interferes with oxygen exposure at the water surface and also makes it difficult to observe the fish being carried. Water with NaCl foams less than water without NaCl, but NaCl may interfere slightly with the effectiveness of anti-foam chemicals.